

WHAT IS CLAIMED IS:

1. A color coded bead for use in a microarray for detecting target analytes, the bead comprising a photochromic compound in a medium, the bead having a receptor molecule on its surface;
wherein the photochromic compound confers on the bead a distinct optical signature; and
wherein the receptor molecule is capable of binding to a target analyte.
2. The bead as defined in claim 1 wherein the distinct optical signature is developed by actinic radiation.
3. The bead as defined in claim 1, wherein receptor molecule is biological or chemical.
4. The bead as defined in claim 1, wherein the bead comprises a mixture of different photochromic compounds.
5. The bead as defined in claim 1, wherein the bead comprises a mixture of photochromic and non-photochromic compounds.
6. The bead as defined in claim 1, wherein the distinct optical signature is produced by controlling a ratio of at least two photochromic compounds or a ratio of at least one photochromic compound and a non-photochromic compound.
7. The bead as defined in claim 1 wherein the distinct optical signature relates to the receptor molecule on its surface.
8. The bead of claim 1 wherein the medium is organic or inorganic.

9. The bead of claim 1 wherein the medium is polymeric.
10. The bead of claim 1 wherein the medium is an amorphous polymer.
11. The bead of claim 1 wherein the medium is polystyrene or poly(methylmethacrylate).
12. The bead as defined in claim 7 wherein the optical signal is fluorescence, absorbency, or chemiluminescence.
13. The bead as defined in claim 1 having a mean diameter of 1 to 50 microns.
14. The bead as defined in claim 1 having a mean diameter of 5 to 20 microns.
15. A microarray for detecting analytes, the microarray comprising a support, on which are disposed the beads defined in claim 1.
16. The microarray as defined in claim 15, wherein the beads are arranged on the support in random or in orderly distribution.
17. The microarray as defined in claim 15, wherein the beads are attached to the support by physical or chemical means.
18. The microarray of claim 15 wherein the support is modified to allow attachment of the microspheres.

19. The microarray of claim 13 wherein the support comprises polymer or glass.

20. The microarray of claim 13 wherein the laydown of microspheres on the support is 100 to a million per cm^2 .

21. The microarray of claim 15 wherein the laydown of microspheres on the support is 10,000 to 100,000 per cm^2 .

22. A method of identifying target analytes, the method comprising the steps of:

- a) providing the microarray of claim 15, wherein the beads carry receptor molecules to which the target analytes can bind;
- b) enabling the target analytes to bind to the receptor molecules thereby producing an optical signal;
- c) detecting the optical signal, indicating presence of the targeted analytes on the bead;
- d) subjecting the beads to actinic radiation;
- e) interpreting the color change in the bead to identify the receptor molecule involved.

23. The method of claim 22 wherein the target analytes are labeled with optical emission tags.

24. A method of identifying target analytes, the method comprising the steps of:

- a) providing the microarray of claim 15, wherein the beads carry receptor molecules capable of binding to the target analytes;
- b) enabling the target analytes to bind to the receptor molecules thereby generating optical signals;
- c) recording the signals as Image A;

d) activating the photochromic compounds in the beads into color signatures and recording them as Image B; and

e) matching Images A and B to determine the identity of the analyte.

25. The color coded bead of claim 1 wherein the photochromic compound is a dihydropyrene, a 1,4-2H-oxazine, a spirothiopyran, a naphthopyran, a triphenylmethane, a benzopyran, an azobenzene, a dithizone metal complex, a thioindigo, a spirooxazine, a spiropyran, a diarylethylene compound or a fulgide.

26. The color coded bead of claim 1 further including a light stabilizer.

27. The color coded bead of claim 1 wherein the light stabilizer is a plasticizer, a hindered amine, a hindered phenol or an excited state quencher.